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| **MEETING MINUTES – Sponsor Meeting** |
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| OWNER: Julia Kim |

Meeting with Pete 02/18/2015

Time: 5:30 p.m. – 6:30 p.m.

Present: Joshua Cushion, Julia Kim, Patrick Delallana, Jasmine Vanderhorst

See what the loss is. Instead of getting all the energy through, you’re just getting the DC value. So how much loss you’re getting overall spectrum. Instead of sampling the overall spectrum, you’re just sampling the DC values. The spectrum components at the bottom are the spectrum of the pulse chain, where the pulse width is 20 nanoseconds and the period is 60 ns. The spectrum of the pulse chain go according to a sinc function. So you would need to find the total energy by summing up the spectral components, where the spectral component would be an amplitude and voltage, square that and then add them up all together, and then look at the total power. Then take the DC components and divide that by the total power and 10 log of that would be the loss, which would be around 4dB. If it’s periodic, you get the spectral components where the amplitude goes according to the sinc function. Each of the components would have a voltage and it’s like a separate sine wave. For example, at 16.7 MHz, you get a sine wave that’s going to have a certain voltage that goes according to the sinc function. You’re going to have another one at 33.4 which is a little lower in voltage because it’s going down according to the sinc function. The idea is to evaluate all the amplitudes, square them, add them and that’s the total power. Then divide that just by the DC components, then take 10 log of that and that’s the loss. That’s how much energy was thrown away because we’re not sampling it at a high rate. Each one of those lines is like a sine wave signal at that frequency. They’re all there simultaneously at different frequencies so you’ll get an RMS voltage for the amplitudes based on the sinc function, square each one, add them, and that’s the total power. There should be a dB value at around 4 or 5 dB.

The field strength meter has been ordered and the RF detector quote would be sent tomorrow by Analog Devices. For the second Fairview order, the low noise amplifier, the cables and the loads are included in there. The payment for the first order is being processed as it has been emitted by FAMU Foundation.

For the receive chain, we can generate a signal. Once we verify the multiplier path and it looks like the VCO is putting out 5 GHz. So once it goes through the multiplier path, we get a 10 GHz signal. We can take a version of that and take it where it’s low power and turn that over to the input of the receiver chain. And that can go all the way back to the receiver components. But we will concentrate on the transmit chain first. We’ll need the cables when we get to the integration with the antenna but we can get by for now.

In regards to the on board reference oscillator for the VCO, Josh went through all the datasheet and references for the evaluation board but there isn’t one for the model we are using. The VCO board is pretty complicated because there are many different frequencies to set it as, you can write to different registers, etc.

As far as testing goes, the transmit path is being started on by Josh and Matt. The next step is to add more components. The detector that was loaned by Pete goes up to 200 milliwatts so it works for the components as the highest that we transmit is about 70 milliwatts. The highest that we get out of any device in the transmit chain, which is the power amplifier, is about 180 milliwatts, so it would be a good idea to get another detector to keep it safe and not stress it out. To test the switching threshold, we would run a pulse generator to it to see if it would switch at 3.3 V or up to 3.5 V. To determine whether it is switching or not, we can run the RF into it from the VCO and put it in the timing port of the switch and then put the detector on one leg of the path and put the attenuator on the other path. And then send out the voltage on the control path until we see something coming into the detector.